

Docket No.: 740756-1400
Application Serial No. 08/520,079
Page 2 of 5

REMARKS

Claims 73-116, 123-141, and 143-155 are pending in this application. Applicants respectfully request reconsideration and allowance of the application in view of the following remarks.

As is shown on page 3 of the Office Action, the Examiner asserts that the evidence presented in Applicants' Appeal Brief filed December 12, 2005, failed to prove that grain boundaries other than boundaries 4 of Zhang et al. exist in the device of Zhang et al., that even if grain boundaries other than those explicitly taught by Zhang et al. exist, the evidence has not shown that these alleged grain boundaries will exist in the specific location of the channel region of Zhang et al., and that even if the alleged grain boundaries must necessarily exist in the channel region of Zhang et al., it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Zhang to form the channel regions in area where the grain boundaries do not exist. However, for at least the following reasons, Applicants respectfully disagree with the Examiner's assertions.

In particular, claims 73-116, 123-141, and 143-155 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,563,426 to Zhang et al. (Zhang). In particular, the Examiner asserts that Zhang discloses, in figure 4b, a channel forming region between source and drain regions, and, in figures 1a-1c, 2a-2d, and 4a-4c, a gate electrode adjacent to the channel forming region having a gate insulating film therebetween, wherein the channel forming region has no grain boundary. However, Zhang fails to disclose, suggest, or render obvious each and every feature of the pending claims.

In particular, Applicants maintain their position that Zhang does not disclose, suggest, or render obvious a channel-forming region having no grain boundary, that a channel forming region is formed in a monodomain region which contains no grain boundary, or that a crystalline semiconductor island is formed in a monodomain region which contains no grain boundary, as recited in the claims. Specifically, Zhang fails to teach, disclose, suggest, or inherently provide a thin film transistor having a channel forming region between source and drain regions, wherein the "channel forming region has no grain boundary," as recited in independent claims 73 and 80. Similarly, Zhang fails to teach, disclose, suggest, or inherently provide a channel-forming region formed in a monodomain region, wherein the

Docket No.: 740756-1400
Application Serial No. 08/520,079
Page 3 of 5

"channel forming region is formed in a monodomain region which contains no grain boundary," as recited in independent claims 93, 105, and 129. Moreover, Zhang fails to teach, disclose, suggest, or inherently provide a crystalline semiconductor island formed in a monodomain region, wherein the "crystalline semiconductor island is formed in a monodomain region which contains no grain boundary," as recited in independent claims 87, 99, 111, and 123.

To the contrary, Applicants maintain their belief that the inherency of the grain boundaries in the channel region of Zhang is clearly established by the teachings of U.S. Patent No. 6,011,275 to Ohtani et al. (Ohtani) and U.S. Patent No. 5,894,137 issued to Yamazaki et al. (Yamazaki). In response to the Examiner's assertions on page 39 of the office action, Applicants respectfully disagree with the Examiner's assertions that Ohtani and Yamazaki fail to show that Zhang will inherently include grain boundaries in the channel forming region. In making this assertion, the Examiner states that Yamazaki teaches that all grain boundaries extend outwardly from the corners of the starting squares 501, and that only the line between two regions adjacent to each other (e.g. the line between the region A and the region B) is a grain boundary. To the contrary, as is clearly stated in column 8, lines 36-37 and lines 48-51 of Yamazaki, grain boundaries are formed in the same direction as the growing direction of columnar or acicular crystals included in the regions A-H, which indicates that *grain boundaries are grown from not only the corners but also sides of the starting squares 501, and that grain boundaries are included inside of each of the regions A-H*. In particular, Yamazaki states that "it goes without saying that the grain boundaries of the crystalline silicon are formed in the same direction as the growing direction of the columnar or acicular crystals." (Col. 8, lines 48-51). In addition, Fig. 5(B) of Yamazaki clearly illustrates the presence of grain boundaries in the regions. Accordingly, Applicants respectfully submit that the teachings of Yamazaki and Ohtani clearly establish that the channel forming regions of Zhang inherently include grain boundaries, and that Zhang therefore does not disclose, suggest, or render obvious each and every feature of the claimed invention.

In addition, with respect to the rejection of claims 92, 98, 104, 110, 116, 128 and 134 under 35 U.S.C. § 103(a) in view of Zhang, Applicants respectfully disagree with the Examiner's assertions that Zhang discloses a monodomain region having a grain size of 50

Docket No.: 740756-1400
Application Serial No. 08/520,079
Page 4 of 5

μm or more and which contains no grain boundary. Contrary to the Examiner's assertions that Zhang's crystal grain (3) has a grain size of 50 μm or more, Zhang's crystal grain (3) does not have the grain size of 50 μm or more due to the presence of grain boundaries, as is described above. In addition, Zhang's crystal grain (3) seems to have grains having a size smaller than 50 μm .

Moreover, with respect to the rejection of the mobility of a p-channel transistor or an n-channel thin film in claims 87, 93, 123, 129, 146, 148, 152, 153, and 155 under 35 U.S.C. § 103(a) in view of Zhang, the claimed mobility of a p-channel transistor or an n-channel thin film is obtained by forming a channel forming region in a monodomain region which contains no grain boundary. As there are grain boundaries in Zhang's channel forming region as explained above, Zhang does not disclose the claimed mobility, and does not have the same utility as that of the claimed invention.

For at least the above reasons, Applicants submit that Zhang fails to disclose, suggest, or render obvious each and every feature of claims 73-116, 123-141, and 143-155, and respectfully request that the rejection of these claims under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,563,426 to Zhang be reconsidered and withdrawn.

In addition, claims 73-86, 93-98, 105-110, 129-136, 138, 140, 144-148, 150 and 153 stand rejected under 35 U.S.C. 103(a) as being obvious over Zhang in view of any one of JP6-140631, JP6-037112, US5,273,921, or US5,207,863. In particular, the Examiner asserts that Zhang renders all of the features of these claims obvious except for the teaching of the channel forming region having no grain boundaries. However, the Examiner asserts that it would have been obvious to modify Zhang so that the channel regions are not formed in the same region as the crystal grain boundary. In this regard, the Examiner asserts that JP6-140631, JP6-037112, US5,273,921, and US5,207,863 disclose that it is advantageous to form a thin film transistor where the channel region is a monodomain region that contains no crystal grain boundaries. The Examiner further asserts that the transistor gets better when the channel region contains no crystal grain boundaries, and that it would have been obvious to modify the transistor of Zhang to form the transistors in regions such that the channels contain no crystal boundaries.

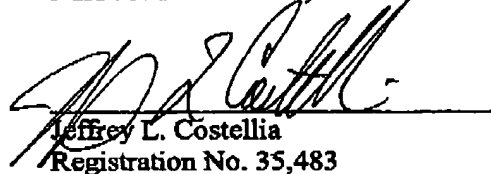
Docket No.: 740756-1400
Application Serial No. 08/520,079
Page 5 of 5

However, as explained above, Applicants respectfully submit that there are grain boundaries in Zhang's channel forming region, and Zhang therefore fails to disclose forming a channel forming region in a monodomain region which contains no grain boundary. Even if the references except for Zhang at al. disclose forming a monocrystalline channel forming region and forming a channel forming region by avoiding a grain boundary, there is no reason or motivation for combining such references to Zhang because Zhang does not disclose any intent to form a channel forming region by avoiding grain boundaries. Accordingly, Applicants respectfully submit that the rejection of claims 73-86, 93-98, 105-110, 129-136, 138, 140, 144-148, 150 and 153 under 35 U.S.C. 103(a) as being obvious over Zhang in view of any one of JP6-140631, JP6-037112, US5,273,921, or US5,207,863 should be reconsidered and withdrawn.

In view of the foregoing, it is submitted that the present application is in condition for allowance, and a notice to that effect is respectfully requested. If a conference would expedite prosecution of the instant application, the Examiner is hereby invited to telephone the undersigned attorney to arrange such a conference.

Respectfully submitted,

NIXON PEABODY, LLP



Jeffrey L. Costellia
Registration No. 35,483

Date: May 22, 2006

Customer No. 22204
NIXON PEABODY LLP
401 9th Street, NW, Suite 900
Washington, DC 20004
(202) 585-8000